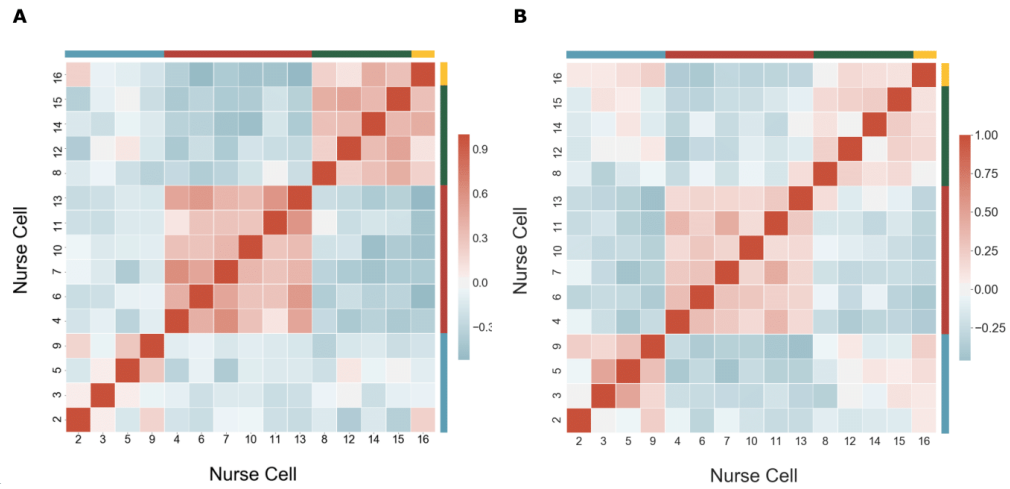


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**Supplemental information**

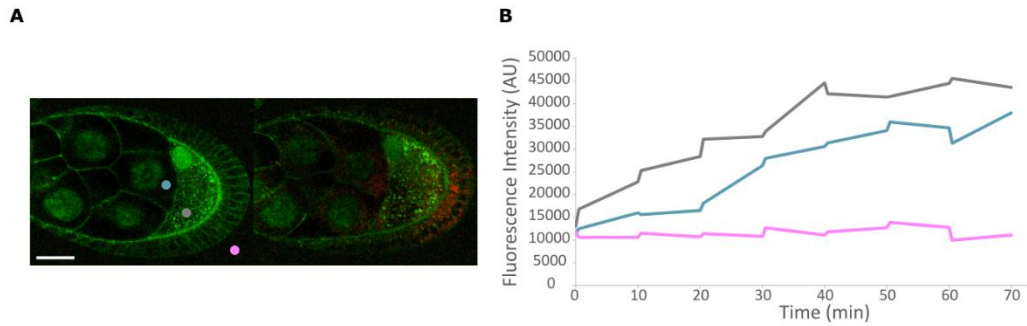
**Coupled oscillators coordinate  
collective germline growth**

**Caroline A. Doherty, Rocky Diegmiller, Manisha Kapasiawala, Elizabeth R.  
Gavis, and Stanislav Y. Shvartsman**



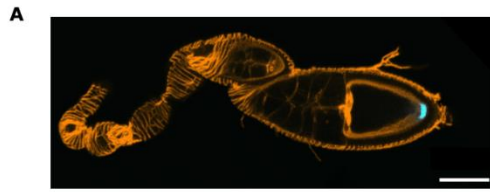
**Figure S1. Pearson correlation coefficient heatmaps for nurse cell nuclear fluorescence show nurse cell group breakdown (Related to figure 1)**

(A) Accompanying heatmap for CycE t-sne (Fig. 1E). (B) Accompanying heatmap for Dap t-sne (Fig. 1F).



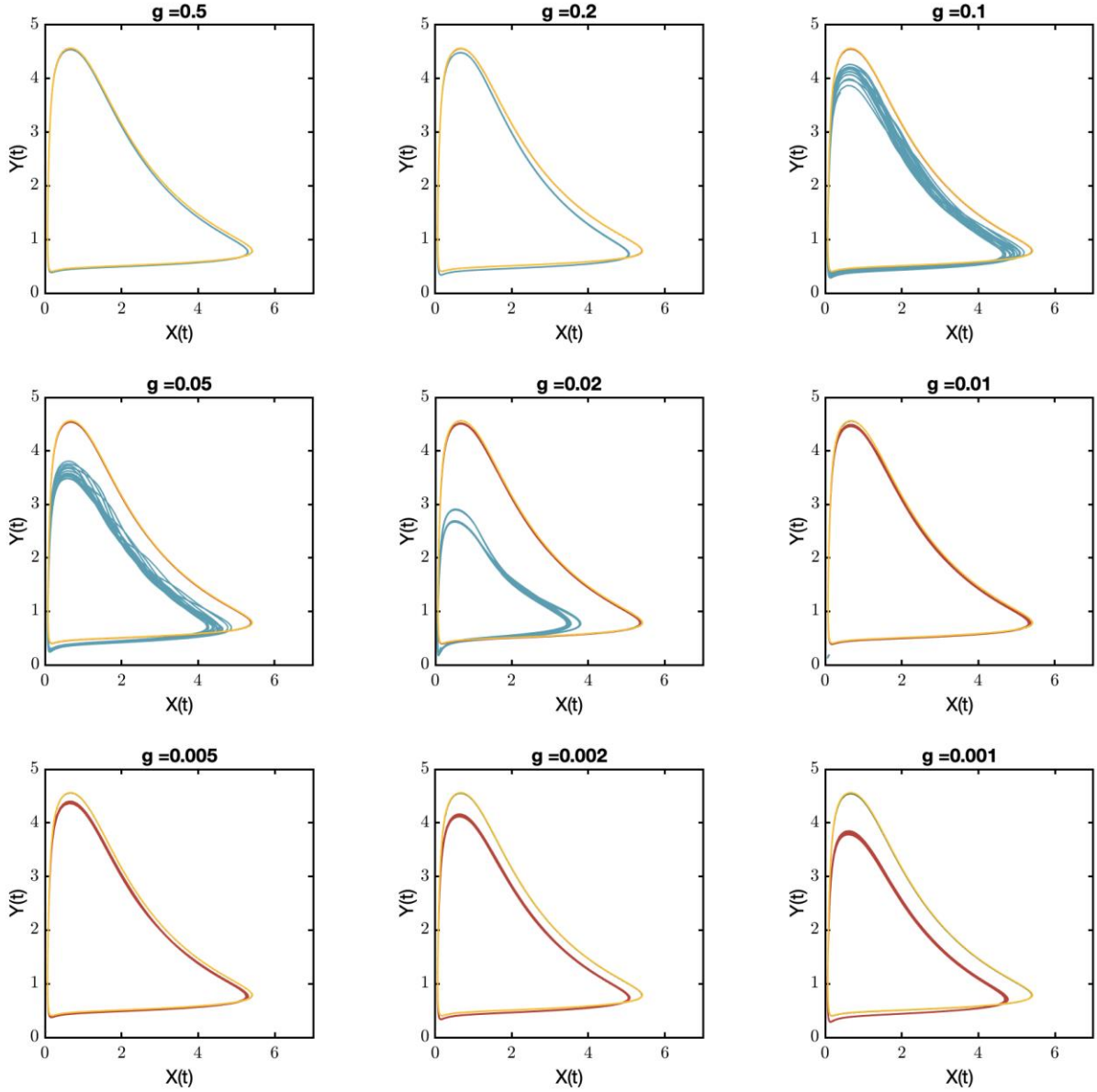
**Figure S2. Additional quantification of appearance of converted Dap-Dendra2 in nurse cells showing that Dap-Dendra2 can diffuse from the oocyte to the nurse cells (Related to figure 3)**

(A) Images of an egg chamber before and 70 minutes after photoconversion events every ten minutes. (B) Membranes are marked with CellMask Green Plasma Membrane Stain. Graph shows fluorescence intensity quantified before and after each photoconversion event. Colors correspond to measurements in different regions of the egg chamber marked in (A). Scale bar = 20  $\mu$ m (A).



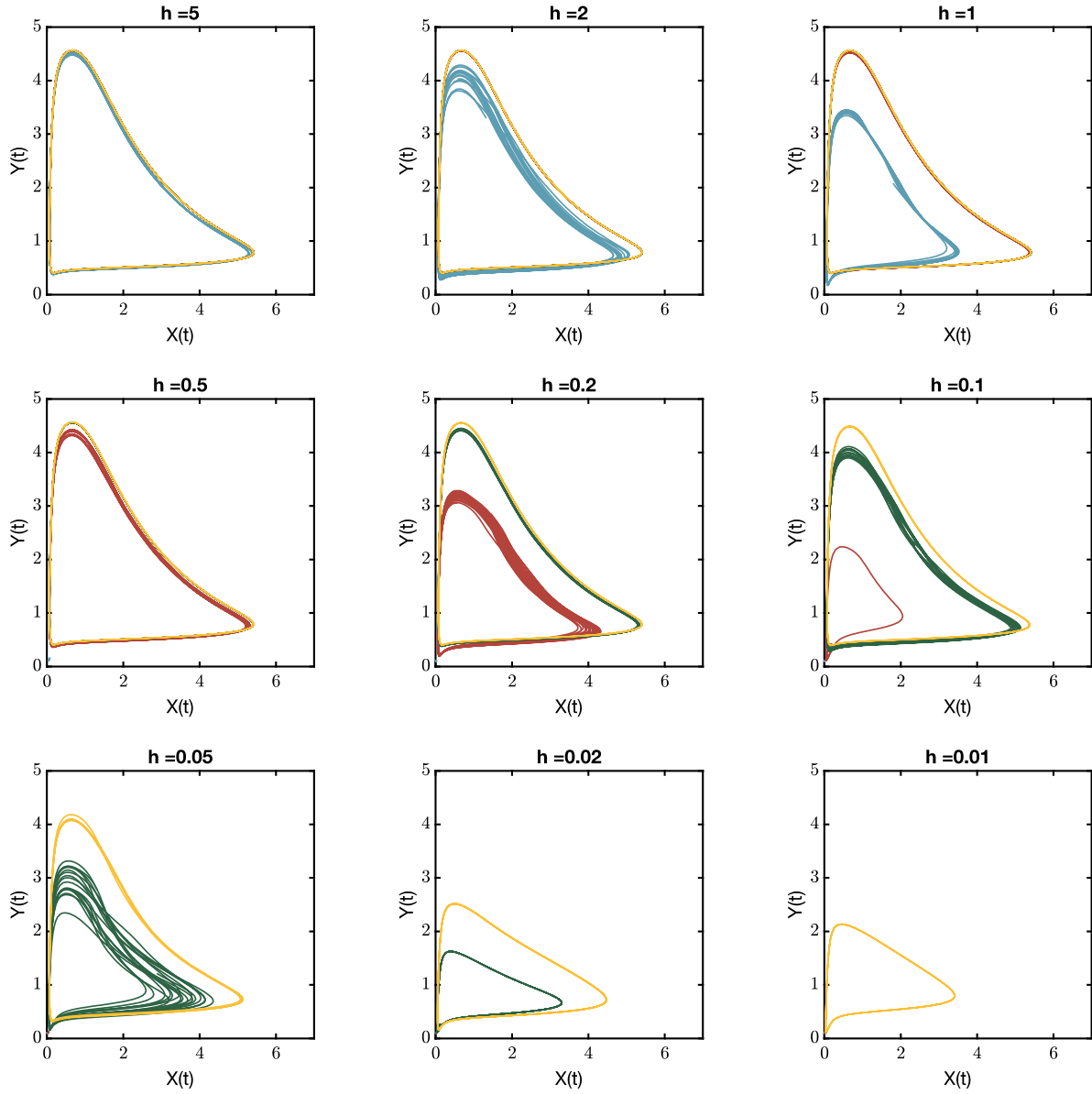
**Figure S3. Localization of Osk-vhhGFP4 is specific to the oocyte posterior (Related to figure 4)**

(A) Confocal z-series projection of egg chambers expressing the Osk-vhhGFP4 transgene (teal). Phalloidin staining of membranes in orange. Scale bar = 70  $\mu\text{m}$ .



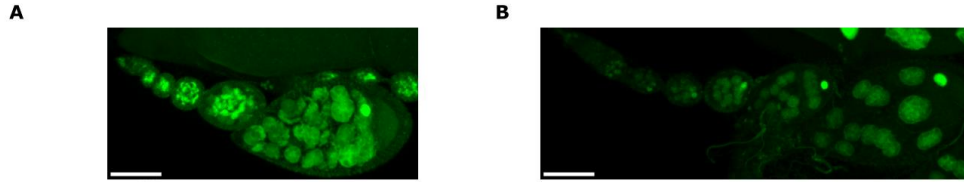
**Figure S4. Groupwise structure of limit cycles, varying degradation rate of component W (Related to figure 5)**

Oscillations between  $X$  and  $Y$  for all nurse cells in the connected cell cluster are greatly affected by the coupled components ( $W$  and  $Z$ ) within the system. Here, we show that as  $g$ , the dimensionless parameter that governs the degradation rate of  $W$ , decreases, oscillatory death occurs within the system in a groupwise fashion, starting with the group directly connected to the oocyte (blue), and then the next closest group (red).



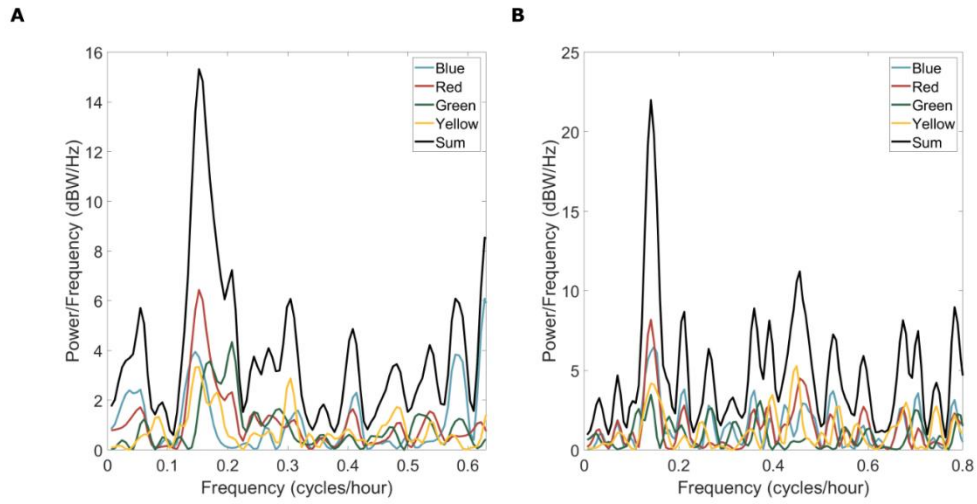
**Figure S5. Groupwise structure of limit cycles, varying degradation rate of component Z (Related to figure 5)**

Oscillations between  $X$  and  $Y$  for all nurse cells in the connected cell cluster are greatly affected by the coupled components ( $W$  and  $Z$ ) within the system. Here, we show that as  $h$ , the dimensionless parameter that governs the degradation rate of  $Z$ , decreases, oscillatory death occurs within the system in a groupwise fashion, starting with the group directly connected to the oocyte (blue), then the next closest groups (red, green, yellow, respectively).



**Figure S6. Lower levels of Dap-sfGFP are seen in DeGradFP-targeted ubiquitination (Related to figure 6)**

(A) Confocal z-series projection of Dap-sfGFP egg chambers. (B) Confocal z-series projection of Dap-sfGFP egg chambers with DeGradFP. Loss of signal indicates destruction of Dap-sfGFP via DeGradFP-targeted ubiquitination. Scale bars = 70 μm.



**Figure S7. Lomb-Scargle periodograms of endocycle regulators show same frequency of oscillations for both CycE and Dap across all nurse cell groups (Related to figure 1)**

(A) Accompanying periodogram for CycE t-sne (Fig. 1E). (B) Accompanying periodogram for Dap t-sne (Fig. 1F).